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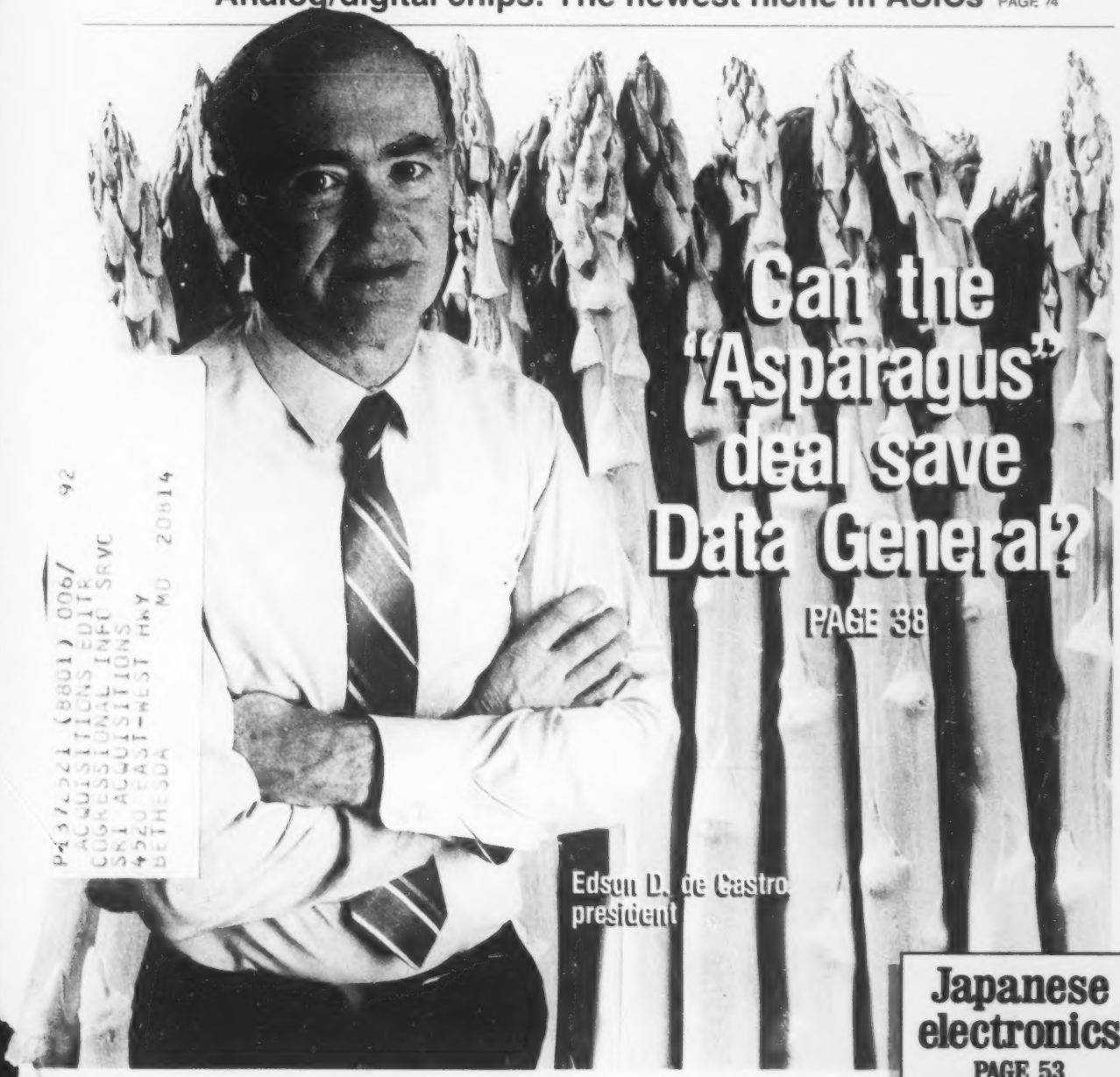
FEBRUARY 1, 1988

SIX DOLLARS

Electronic Business®

Coming home: The revival of U.S. mask production PAGE 68

Analog/digital chips: The newest niche in ASICs PAGE 74



Can the "Asparagus" deal save Data General?

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Edson D. de Castro, president

Japanese electronics

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Electronic Business

VOL. 14, NO. 3 FEBRUARY 1, 1988

FOR THE MANAGEMENT TEAM IN ELECTRONICS, COMPUTER AND SYSTEMS COMPANIES

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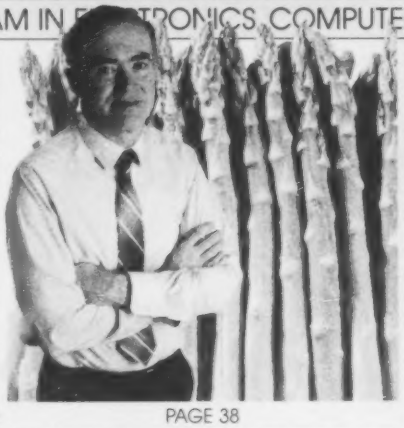

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Cover photo: Dave Bradley

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Accentuating the positive: A good year for distribution

What crash? Distribution orders keep going up, while cancellations don't

Last October 19, the day the stock market crashed, Avnet Inc.'s board chairman Tony Hamilton called an urgent teleconference with his outside directors. He wanted to know if their companies, which are in banking and computers, saw the crash as curtailing capital investment, which is the major engine that pulls the electronics industry in the United States. The directors saw no immediate impact but counseled caution, and to keep a watchful eye on the two major indicators of the distribution business: incoming orders and cancellations.

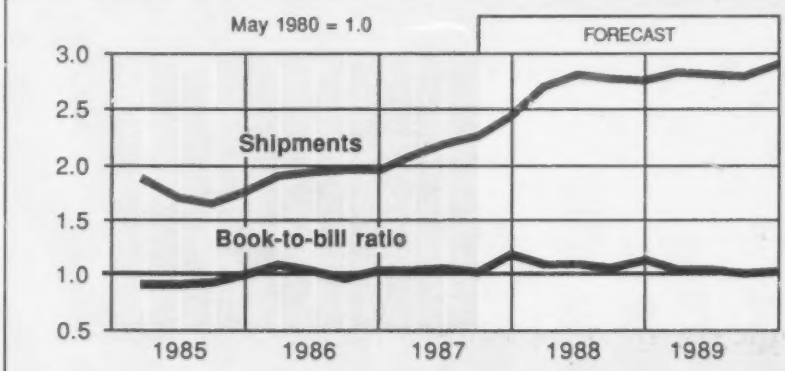
Like Hamilton, most other U.S. industrial distributors worried about their prospects for 1988. Fortunately, the number of positive indicators seems to overwhelm, so far, that single but large negative one from last October. The National Electronic Distributors Association's book-to-bill ratio not only kept its head above unity, but it closed October at 1.08. Moreover, November's ratio was even higher, at 1.10, the highest since April. For Avnet's Electronic Marketing Group, which by itself represents a volume of business half as large as that of the 17 distributors that make the NEDA sample combined, November's book-to-bill ratio was 1.20, a record for the year. If distribution customers had wanted to cancel orders, they had plenty of time to do so in October and November. Avnet's orders kept going up in December, yet "we've seen no change in cancellations," says the obviously pleased Hamilton.

The reason for the strong distribution orders, according to the engineering manager of a small New England company that builds industrial automation based on Intel Corp.'s newest microprocessors, is that his company's life depends on distributors. "I can't compete with Compaq," he laments. "Intel puts me on allocation; my only hope is the distributor. To have more clout, I buy then, from the distributor, most of my components." This suits Hamilton/Avnet Electronics — the major unit of Avnet's EMG and Intel's largest distributor — just fine. "Our business is made up of a series of small orders," explains Hamilton.

The NEDA index for shipments ended 1987 ahead of 1986, by 15%, and the association looks forward to at least 16% for 1988. "We'll be 33% ahead of NEDA's forecast in 1988, because of the things we have in the mill," says Hamilton. NEDA may be conservative. Based on NEDA's shipments and using the Cahners Early Warning Indicator, senior economist Elizabeth Baatz of Cahners Economics forecasts 24% growth for shipments in 1988. Even at that, Hamilton may be right. The things Avnet has "in the mill" include a forecast by Digital Equipment Corp. that Avnet will distribute $500 million worth of DEC's products in 1990.

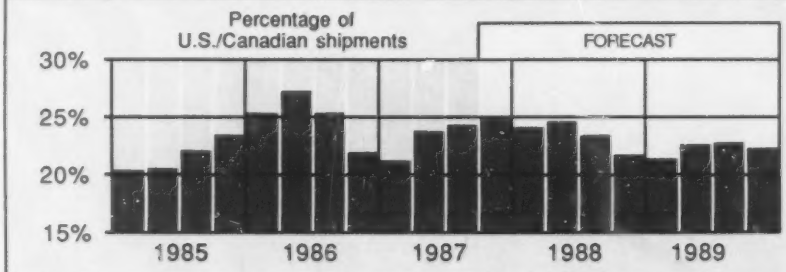
ALBERTO SOCOLOVSKY

Distribution business index



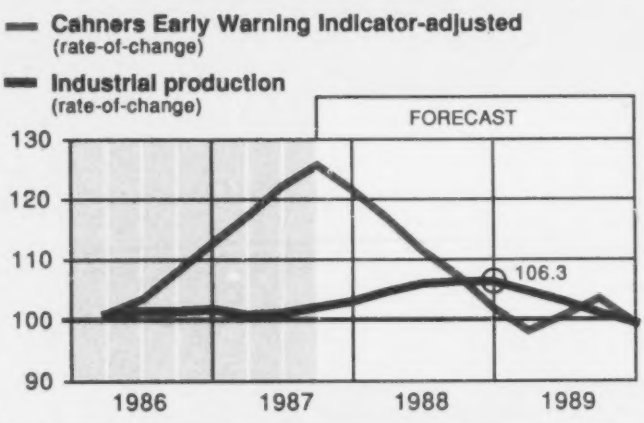
Source: National Electronic Distributors Association; Forecast: Cahners Economics

Distributors' share of total semiconductor shipments



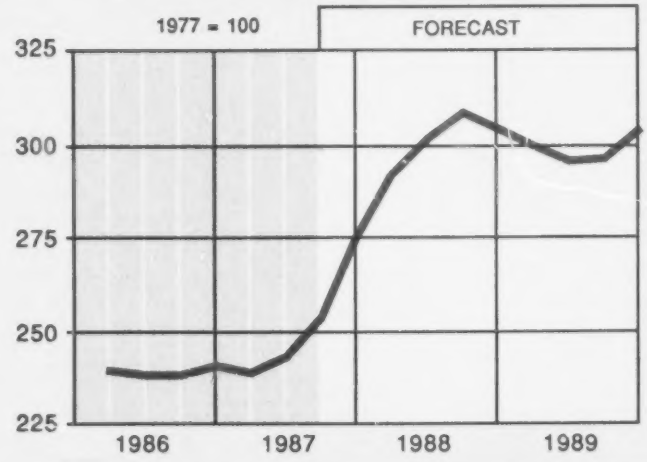
Source: Semiconductor Industry Association; Forecast: Cahners Economics

Economic indicators



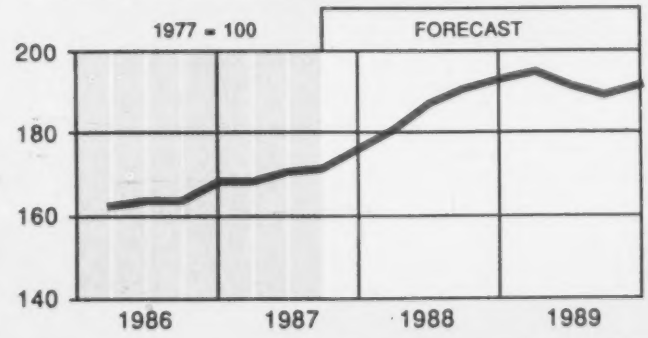
Electronic components

Industrial production index, seasonally adjusted quarterly averages



Equipment, instruments and parts

Industrial production index, seasonally adjusted quarterly averages



Historical data: Federal Reserve Board; Forecast: Cahners Economics

Steady growth expected

The United States Index of Industrial Production, a coincident indicator of the U.S. economy, has been climbing steadily since the summer of 1986. During 1987's third quarter, output rose 2.1% from the prior quarter and was up 3.1% year-to-date compared with the previous year. This slow and steady growth is expected to continue until this summer. Production is expected to rebound after a year and a half of sluggish growth, pushing production up 6.3% this year. The impetus for this upturn will be increasing U.S. exports, due to the decline in the dollar's value, inventory replenishment and growth in equipment investment.

The Cahners Early Warning Indicator (CEWI) has been adjusted by deleting the unusual effects of recent changes in financial markets. The adjusted indicator points to an upturn in the economic business cycle with the next business peak in August of 1988. The CEWI is a weighted average of housing starts, the Dow Jones Industrial Stock Index and the money supply (M2), deflated by the Consumer Price Index. The CEWI has proven to be an excellent tool in forecasting the turning points in the economic business cycles about 12 months in advance. The black curve is a plot of the 12-month rate of change Index of Industrial Production. That change over a 12-month period can be determined by comparison with the line at 100. For example, the 106.3 level forecasts using the CEWI for the end of this year indicates that the average for all of 1988 should be 6.3% above 1987.

More information can be obtained from Elizabeth Baatz, economist, Cahners Economics Department, 275 Washington St., Newton, Mass. 02158.

Equipment, instruments and parts

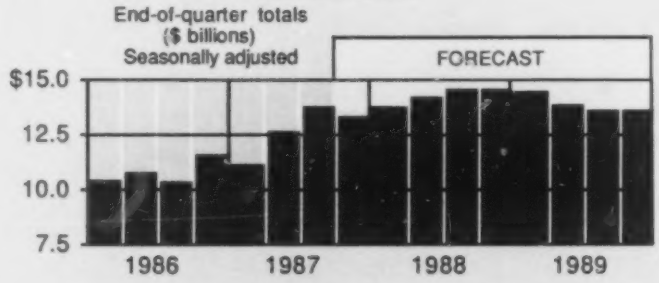
Output at U.S. factories of instruments and other equipment rose 0.5% in the third quarter of 1987 and is expected to rise another 2.6% in the fourth quarter. Shipments of scientific, engineering and manufacturing instruments hit a new record last summer and records will continue to be broken in 1988; and instruments production is expected to grow 9.5%.

Electronic components

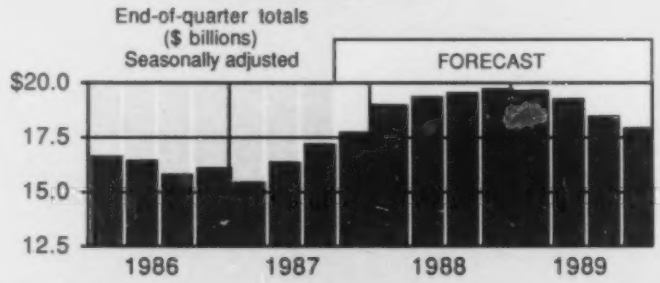
Electronic components output rose 4% in last year's third quarter. The fourth quarter is expected to show even more growth, as inventory stocks are rebuilt. By the end of 1987, components production is expected to rise 12%. The outlook for 1988 is 19% growth followed by a 1% drop in 1989. Capacitors, ICs and custom components will see the most growth in 1988. Passive components and commodity-type components will grow more slowly than average.

Electronic components (SIC 367)

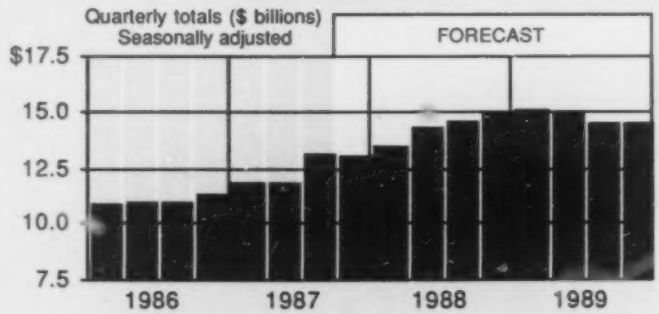
New orders



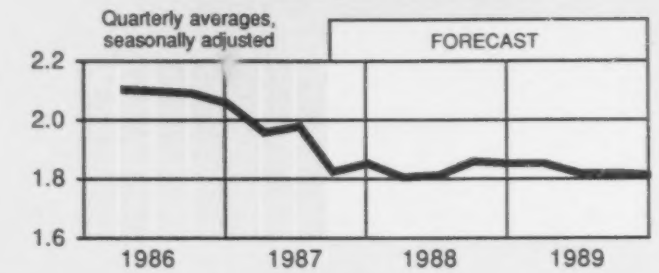
Unfilled orders



Shipments



Inventory-to-shipment ratio



Historical data: U.S. Commerce Department; Forecast: Cahners Economics

New orders

A 9% surge in component orders in 1987's third quarter will help boost new orders an estimated 18% in 1987. By September 1987, orders had risen 32% above the dismal 1986 September level. Last year's solid performance has set the stage for continued gains in sales and production this year. In a typical business cycle, orders hit their peak growth rates prior to other indicators. Orders are expected to peak early this spring, which means the business cycle downturn is likely by 1989. The growth outlook for 1988 orders is 13%, followed by a 3% drop in 1989.

Unfilled orders

After totaling a low of $15.1 billion in January 1987, unfilled orders for components jumped to $17.0 billion by last September, the highest since early 1985. Backlogs of components have held stubbornly low since the big buildup in inventories in 1985. Now that inventories have been worked down, backlogs are expected to expand. This will be the first positive annual gain since 1984. But compared with a 37% surge in backlogs in 1984, growth this year will be a more modest 18%.

Shipments

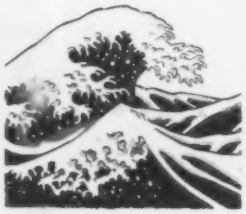
Shipments of electronic components jumped 11% in last year's third quarter and are expected to fall just 1% in the final quarter. With such a strong third quarter in place, shipments are expected to rise 12% in 1987, paralleling the gains in production and orders. Growth in U.S. shipments of components was fueled by gains in exports, a slowdown in import penetration of the U.S. market, inventory restocking and domestic end-market demand. The turnaround in the trade statistics should not be underestimated. The sharp drop in the value of the Japanese yen and European currencies is finally translating into stronger U.S. export demand. Shipments are expected to grow another 16% in 1988 and 3% in 1989.

Inventory-to-shipments ratio

The inventory-to-shipments ratio plunged dramatically last summer to average 1.83, the lowest quarterly ratio ever. The sharp rise in third quarter shipments was simply not matched by rising inventories. The ratio has dipped lower than ever before because inventories are being managed better. Computer tracking, tighter supplier relationships, and a commitment to just-in-time delivery are being reflected in these statistics. This year the I/S ratio will likely remain in the 1.8 to 1.9 range.

BY MASARU YAMANO

Sanyo sees major expansion for the optoelectronics market



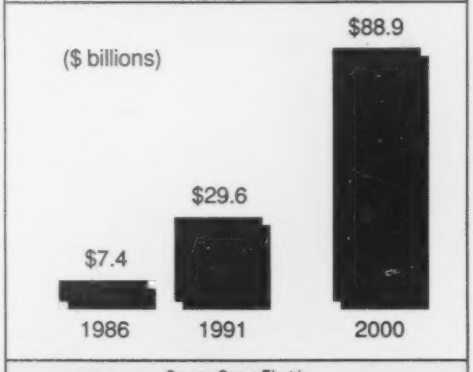
Optoelectronics

The abundance of goods and services available today to much of the world's population has been achieved to a large extent via technology. Mechanical technologies, once the main source of new developments, have given way to electronics technologies. And, in recent years, world attention has shifted toward such fields as optoelectronics, biotechnology, artificial intelligence and superconductivity. One of the key technologies in this group is optoelectronics. It will have a profound impact on all aspects of the transmission of information, promising improvements in speed, density, capacity and cost.

In the electronics industry, the development of one key component can create a whole spectrum of new products and can lead to further technical breakthroughs as well. Components such as vacuum tubes, transistors, and integrated circuits of ever greater complexity have been successfully harnessed in radios; black and white and color televisions; and tape recorders and VCRs, creating huge markets in every case.

Now, a new generation of products based on optoelectronic technologies is becoming available. These products, which include the compact disc (CD) player and laser vision, have opened entirely new markets which are already growing rapidly. But until the advent of the CD player, the production of laser diodes was relatively low. Only 66,000 were produced in 1982, the year CD players were introduced. In contrast, 8.7 million laser diodes were made in 1986.

Value of the Japanese optoelectronics market is expected to surge



Source: Sanyo Electric

Largely because of the CD's popularity, lasers and optical discs have found their way into an array of additional products. For example, CDs have been adapted for use in the office as a data storage medium. Their first application was as read-only memories (CD-ROMs), but technical refinements have now led to the introduction of recordable and erasable memory systems.

Another office application is the high-definition optical disc video filing system. This product's developers expect it to be used for storing archives of high-quality images in libraries, museums, hospitals and publishing companies. Archival storage equipment for ordinary documents is also on the market.

In the consumer electronics field, CD-video players and interactive CD players appeared not long after the popularity of music CDs was established. One of the most recent products is a laser disc player called the "three in one," which plays three types of discs: CDs, CD-videos and laser vision.

Those examples, however, represent just a small portion of the total market of optoelectronics. In Japan, the market for optoelectronic products was valued at $7.4 billion in 1986, with optical disc equipment accounting for about 30% of that total. The market's value is expected to reach $29.6 billion in 1991, and $88.9 billion by the year 2000. For the next five years, the industry estimates that the growth rate for this market will exceed 30% annually. Estimates of the market growth rate for consumer products using optical discs and laser diodes are even higher.

Any technology, including optoelectronics, can only progress when it is utilized worldwide. To make this possible and to alleviate trade conflicts, Sanyo Electric Company Ltd. has established 75 overseas sales offices and manufacturing plants. One of the newest is the Sanyo Laser Products manufacturing plant in Richmond, Ind. Mutual cooperation not only advances technology, but it also is an essential condition for global prosperity in the 21st century. □

Yamano is executive vice president of Sanyo Electric Company Ltd. and a member of its board of directors.

SEMICONDUCTOR PRODUCTION

America's chip mask makers stage a dramatic recovery

Merchant mask producers have cleaned up their act after realizing that Japanese rivals were waiting in the wings

By Carol Suby

The U.S. semiconductor mask-making industry — in danger of disappearing just a few years ago — is now emerging as a shining example of how a moribund U.S. market can make a comeback.

After wavering in the $400 million range for the past several years, the domestic market for photomasks — photographic glass plates used to transfer circuit patterns onto semiconductor wafers — is growing once again, and is forecast to reach approximately $620 million by 1991, according to research and consulting firm, Rose Associates in Los Altos, Calif. More impressive, however, is the fact that this sector, previously close to expiring from self-inflicted wounds, has been able to make a startling recovery.

Resurgence is thanks to several coincidental factors: growth in the ASIC sector, where more masks are used; the fear inspired in domestic mask makers, and their consequent action, when they saw Japanese suppliers getting orders from major semiconductor houses; prodding by one particularly demanding ASIC vendor; and the emergence, for the first time, of a major domestic mask maker: Du Pont.

Just three years ago, mask prices were in free-fall — some 30% to 50% in a year. Meanwhile, the trend toward smaller geometries on integrated circuits required that merchant mask makers — which averaged between $3 million to $15 million in revenue — purchase state-of-the-art equipment that carried $1 million to $3 million price tags. "Companies that size weren't sure they could justify such an investment," says Jerry Hutcheson, corporate officer at San Jose-based research firm VLSI Research Inc. As a result, he says, "in some cases, they chose to do nothing."

And merchant vendors weren't the only ones feeling the pinch. Amidst the most severe downturn in semiconductor history, internal mask operations were hard pressed for capital dollars as companies cut expenses to the bone. Overall, domestic mask manufacturing suffered. Products became characterized by poor quality. Also, they were not cost competitive nor did they meet customers' cycle time demands. If the U.S. suppliers had continued on this tack, their business may have ended up "almost exclusively in Japan," says A. Travis White, vice president for assembly, test and packaging development at ASIC chip maker LSI Logic Corp. of Milpitas, Calif.

In fact, while U.S. vendors were gasping, Japanese vendors like Dai Nippon Printing and Toppan were just getting into their stride. These two, each under the umbrella of multibillion dollar enterprises, could afford whatever equipment was necessary to do the job right. They were also large enough — together they hold approximately 80% of the total photomask market in Japan — to enjoy economies of scale unmatched by any U.S. firm. During the semiconductor downturn, these offshore companies inked deals with four of the top five U.S. semiconductor houses.

Agents of change

Bit by bit, domestic companies began to react. Micro Mask Inc., based in Sunnyvale, Calif., had been a major supplier to Intel Corp. However, "management in the photomask division didn't keep current or pay enough attention to the demands of the marketplace," says Joseph Ross, chairman and chief executive officer of Micro Mask. Within that same time frame, Intel — which depends entirely on merchant suppliers for its masks — began to do business with Dai Nippon. In reaction, Ross went on the warpath.

Management was replaced, and the photomask division at Micro Mask, "embarked on changing the philosophy and culture of the busi-

Rod Thomas

Center stage again: U.S. mask makers can thank LSI Logic -- and Du Pont

ness, from the president on down to the janitor," says Ross. Meetings were held with people throughout the organization to discuss what was keeping them from being successful, "and then we'd make sure corrective actions were taken within a week," Ross notes. This close attention to improving business from the bottom up, combined with a stronger focus on meeting customer demands — which required spending nearly $9 million in capital equipment during two recession years —helped to turn around the fortunes of Micro Mask. Revenue grew 19% during 1986 and approximately 25% during 1987, according to Ross. Profitability also returned in 1987, according to Ross. In addition, the company has moved up from No. 4 in market share for 1985 to No. 2 for 1987, behind Du Pont's combined Tau Labs and Master Images operations.

Japanese vendors weren't the only ones to shake up complacent mask makers. Others applaud Tau Laboratories Inc. as a merchant vendor that contributed to the turnaround. Headquartered in Poughkeepsie, N.Y., Tau Labs opened a facility in Kokomo, Ind., where it took over the mask operations of General Motors subsidiary Delco Electronics in late 1983. Later, this Kokomo operation began "beating Silicon Valley companies on turnaround times, on price, and on getting things right the first time," says Robert Clary, principal associate with Rose Associates.

The sleeping valley companies began to wake up. And giving them an extra push was ASIC firm LSI Logic Corp., which many in the industry credit for being a major agent of change. Four years ago, LSI Logic went to 26 different mask suppliers and asked for three-day cycle times — the time from when an order is placed to when it arrives at the customer's dock. "They told me I was crazy," says White. Tau Labs, now owned by Du Pont, was the only company willing to take on the job. Today, LSI Logic has four major mask suppliers that can deliver products in less than 26 hours. "Suppliers in Japan, in Europe, can't do that," White points out.

The domestic market for photomasks is growing again and is forecast to reach $620 million by 1991

Another major contribution was the formation of the first domestic mask giant. During the past two years, E.I. du Pont de Nemours and Co., based in Wilmington, Del., purchased the two largest independent mask makers in the United States — Tau Laboratories and Master Images. Du Pont's interest in the photomask market is "a way to participate in the semiconductor industry long term," says David Heilman, vice president, photomask operations, at Du Pont Tau Labs' Kokomo facility. The company's long-term plans include expanding its photomask operations to Europe and Japan with the expectation of becoming a world leader. Now that the United States has a giant company with resources behind it, it has become "a whole new ball game," says Hutcheson of VLSI Research.

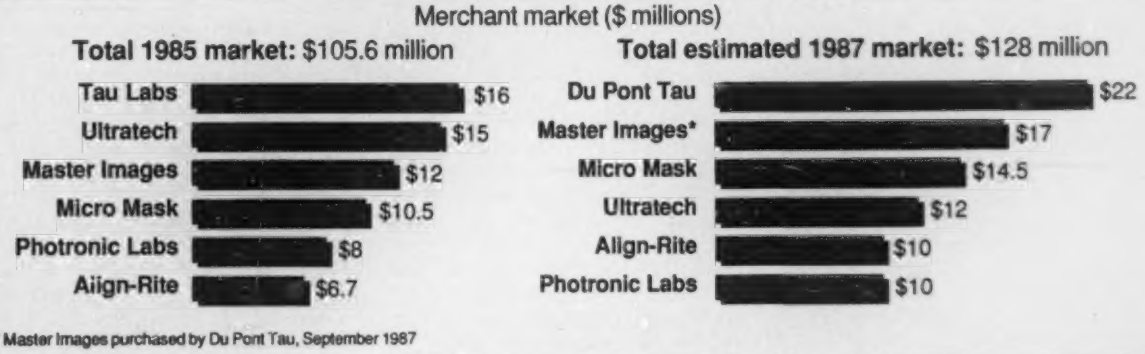
The new ball game also has a new team. The American Photomask Association, formed in 1986, created a forum where mask suppliers, its semiconductor manufacturing customers, and the equipment suppliers could work together to resolve industry-threatening issues, says Steven Wilson, chairman of the association, and sales manager for General Signal Corp.'s Ultratech Photomask operations. Contributing to the association's success is the fact that the world standards for the equipment used to manufacture, inspect and repair wafers are set by U.S. companies. In fact, Perkin-Elmer Corp., based in Norwalk, Conn., holds approximately 90% of the worldwide market for E-beam equipment, which is at the heart of mask making. And the equipment used for wafer inspection comes predominantly from KLA Instruments Corp., based in Santa Clara.

The turnaround

Today, "American photomask suppliers have made a phenomenal readjustment to serving the semiconductor manufacturers," says White of LSI Logic. "Quality is now superb [and] as good, or better than anyplace in the world. In the area of cost competitiveness, they've made dramatic changes." Cycle times, he adds, have also vastly improved. In addition, the tide of foreign competition appears to be stemmed. Japan has never been able to capture any more than 5% of the U.S. market, according to Clary of Rose Associates.

Coincidentally, the growth of the ASIC market in the United States has also contributed to this turnaround.

In the domestic photomask arena, market leadership holds no guarantees



Source: Rose Associates

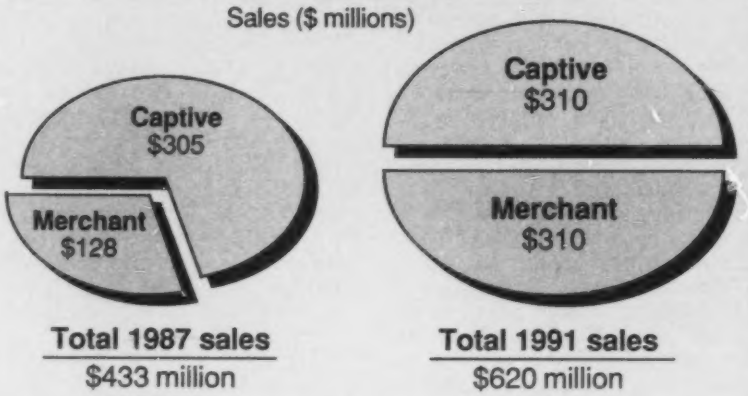
"ASIC companies generally use more photomasks than others," points out Michael Yomazzo, vice president for sales and marketing, for Photronic Labs Inc., a merchant mask maker headquartered in Brookfield Center, Conn. Not only do ASICs require more masks, they are also becoming an increasing portion of the total semiconductor pie. Last year, ASICs represented 16% of the $29 billion worldwide chip market, according to research firm Integrated Circuit Engineering Corp., in Scottsdale, Ariz. By 1992, they are expected to grow to 22% of a $48 billion market.

While U.S. suppliers of photomasks are once again on a competitive bent, that does not mean they can now rest easy. Mask makers lead a draconian existence. Austerity is key in an industry that must spend heavily to stay alive. According to Micro Mask's Ross, it will, with the new generation of E-beam equipment, require about $7 million in investment to generate up to $11 million in sales. One ingredient for survival, says Wilson of the APA, is "to drive the cost of manufacturing way down. Those who are successful will stay in business. Those that can't, will go out of business."

Indeed, many captive suppliers, suffering from budgetary neglect, are closing down all or portions of their internal photomask shops. For example, Motorola Inc.'s Austin, Texas, photomask operations were taken over last year by Du Pont Tau Labs. (However, Motorola continues to invest in and operate its Mesa, Ariz., photomask facility.) Gould AMI Semiconductor, Santa Clara, sold off its mask operations — Advanced Micro Images — to Du Pont Tau, which moved the equipment and businesses to other locations and ceased AMI operations. Also during 1987, Signetics Corp., Sunnyvale, Calif., closed down its photomask operations and now relies entirely on merchant suppliers. Most in the industry expect that even more captive operations will be sold off or shut down over the next year.

This particular trend, however, translates into more business for the merchant vendors. In fact, Clary of Rose Associates estimates that by 1991 merchant vendor revenue will represent about 50% of the estimated $620 million domestic market. (Today, the revenue is split approximately 2-to-1 with captive shops representing the majority.) A big question mark remains, however, regarding who will survive until the 1990s in the photomask arena. But the disappearance of some players is not necessarily bad for any market. Because of all the competition, the return on investment just isn't there, says Kenneth Wishnuff, director of lithography for the semiconductor division of National Semiconductor Corp., in Santa Clara. "Maybe we need for some companies to go away," he adds.

Merchant mask makers are picking up the business that captive suppliers are shutting down



Source: Rose Associates

Although consolidations are expected to continue for the next several years, other companies are expanding. Align-Rite International PLC — the British holding company for Align-Rite Corp. in Burbank, Calif. — is involved in a $35 million five-year expansion plan. The company began its European operations in Wales in September 1985. An additional facility is expected to begin operations by the first quarter of 1989 in Nijmegan, the Netherlands, according to James MacDonald, president of the Burbank facility and chairman of the holding company. Align-Rite is the only mask maker with multinational manufacturing facilities, says MacDonald. The company is also exploring the possibility of opening up a facility in the Far East. And, according to MacDonald, Align-Rite is likely to become involved in the acquisition process in the near future.

By 1991, merchant vendor revenue will represent about 50% of the domestic mask market

Photronic Labs is also in an expansion mode. Over the past few years, Photronic has spent more than $15 million on capital expenditures, most of it going to its newly opened photomask facility in Milpitas, Calif.

The No. 1 player, Du Pont, might have future acquisition plans, but the goals for 1988 are quite basic. With facilities in New York, Indiana, Texas and California, the major challenge for 1988, says Heilman, is getting all of the operations coordinated and "tied together as a team, so that the various locations become transparent to the customer."

Indeed, serving the customer is the main focus for all of the photomask players, especially at this time when customers are paring down the number of suppliers they use. There is a question of how much expansion can be managed before a company suffers from being spread too thinly. As a result, not everyone is in a geographical expansion mode.

The strategy at Micro Mask, "is to keep to one location, work like hell, and grow," says chief executive Ross. Despite growing at a faster rate than the overall market in terms of revenue, the total number of customers Micro Mask is serving has declined. But this is "by design," declares Ross.

Currently, approximately 75% of Micro Mask's business comes from five major customers, while the total number of customers beyond that has shrunk considerably. "We concentrate on developing a roster of customers with whom we can expect up to $1 million in business a year," says Ross. The company is now looking to add two to three more such customers to its roster while cutting down on servicing those that have minimal needs. □

SUPERMINICOMPUTERS

Did super sales of '87 mark a supermini peak?

Competition from microprocessor-based systems clouds the outlook. Who will get crushed by the Unix bandwagon?

By Mary Jo Foley

To many vendors, the minicomputer market has been a kind of final frontier. It is the one major computer segment least dominated by IBM, and its high-end, or supermini, portion has hospitably accommodated diverse players targeting markets ranging from on-line transaction processing to seismology. The strong and steady sales exhibited by most supermini participants in 1987 — despite the lack of major hardware introductions — has led many to believe that departmental computing will continue to provide solid opportunities in the foreseeable future.

And, indeed, nearly every supermini vendor is calling for 1988 to be a banner year. However, a growing number of market watchers is predicting that 1988 may prove to be less profitable than expected for many supermini makers.

At the high end, Digital Equipment Corp. is expected to unleash at least one major new product, dubbed the vector-VAX, along with a parallel-processing version of its VMS operating system. At the lower end of the midrange market, IBM is slated to debut its long-awaited "Silverlake" — an amalgamation of its current System/36 and System/38 minicomputer lines. In between, other vendors are expected to continue to shore up and replace their existing product families.

The importance of standards — in particular, the Unix operating system — is on the rise. This is good news for the many start-ups, second-tier vendors, and handful of brand-name players, led by Hewlett-Packard Co. and Unisys Corp., which have embraced Unix. It may spell trouble for other companies, including DEC and IBM, which offer Unix as a second or third choice to their proprietary operating systems.

As if all this were not enough, a new generation of microprocessor-based systems, including systems based on the new Motorola Inc. 32-bit processor, are expected to be launched as competitors to existing systems in the coming year. "By the end of the decade, the new buzzword will be microprocessor-based systems," according to International Data Corp. midrange systems analyst Christopher Hallgren. As a result, "traditional vendors will need to become software vendors and/or sell much cheaper hardware" in order to survive, he claims.

Nearly every supermini vendor is calling for 1988 to be a banner year

In spite of these confusing trends, several industry watchers are predicting continued strong supermini sales for the market as a whole. Framingham, Massachusetts-based IDC estimates that worldwide shipments of midrange computers by U.S.-based vendors reached 37,000 in 1987, and should hit 44,200 in 1988. (IDC generously defines "midrange" as systems costing between $100,000 and $1 million, usually configured for 17 to 128 users. This definition includes many "traditional" minicomputers, as well as many of the minisupers now on the market.) The dollar value of this market will grow roughly 8.8%, IDC adds, from $16.2 billion last year, to $17.62 billion in 1988.

But not all industry gurus are calling for smooth sailing. "It may be this product category [superminis] is starting to age, as categories above and below are eclipsing it," suggests Gregory Kosinski, an analyst with Dataquest Inc., of San Jose. "There will continue to be growth [in superminis], but nowhere near as dramatic as at the other two ends of the computer spectrum."

Some market watchers are even more severe in their predictions. "It is our opinion that the [mini] computer systems business is on the verge of major secular change," says John Levinson, an analyst with New York City-based Goldman, Sachs & Co. "The vendors that could be most negatively affected in this new environment are, in fact, those that benefited the most from the ways of the past," he says, namely, Data General

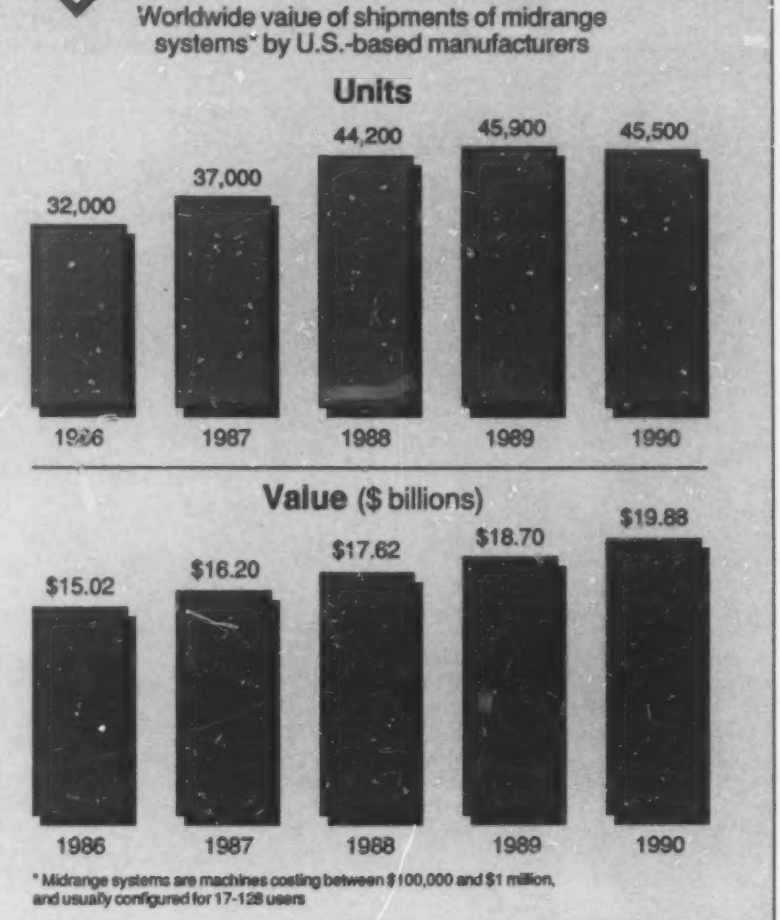
Marty Braun

Corp., DEC, IBM, Prime Computer Inc., Unisys, and Wang Laboratories Inc. Those which are best suited to adapt to the emerging midrange world — where integration, standards, competitive microprocessor-based systems, and self-service (as opposed to vendor-provided service) are key — are companies such as AT&T, Hewlett-Packard, Ing. C. Olivetti & Co., Sequent Computer Systems Inc. and most of the European-based computer vendors. And those which promise to be the least affected by the changing minicomputer environment, mostly as a result of their specialized niche strategies or current strategies which take the new integration, interoperability, and standardization requirements into account, Levinson claims, are NCR Corp., Siemens AG, Stratus Computer Inc. and Tandem Computers Inc.

Vendors still optimistic

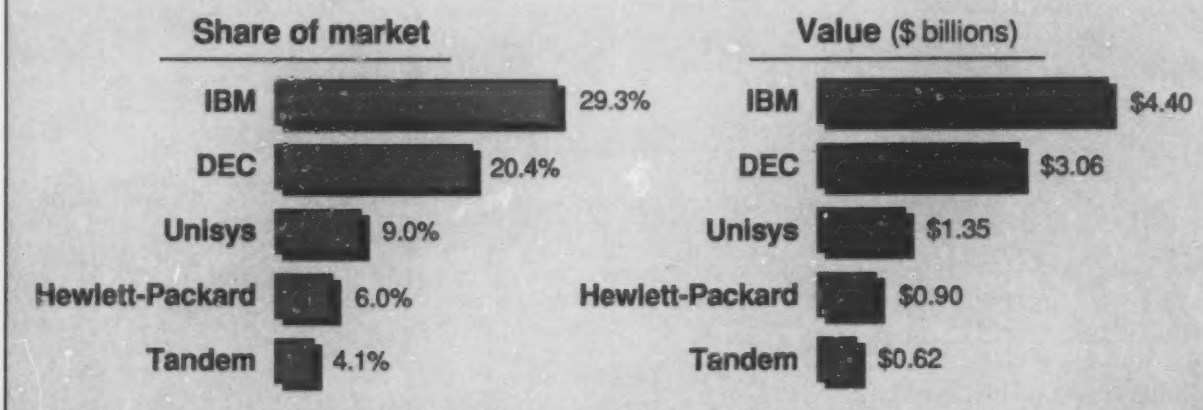
Most analysts agree that, by far, most of the demand for midrange systems in 1988 will come from companies that already have deployed departmental solutions. The Sierra Group, a Tempe, Ariz. market researcher, found that more than half of the 1,045 U.S. companies which it recently surveyed, with annual sales ranging from $10 million to $3 billion, planned to purchase minicomputers during the coming year. In its surveys, IDC has found midrange computer buyers to be split fairly evenly between commercial- and sci-

Superminis: Steady as they go



Source: International Data Corp.

DEC runs a close second to IBM in superminis



Source: International Data Corp.

entific/engineering-oriented concerns; by the end of the decade, the latter customer group will grow at the expense of the former, the market researcher says.

However, just because spending is on the rise does not mean all vendors can count on a bigger piece of the midrange pie. "The departmental minicomputer market has entered the first stages of a zero-sum marketing game, and one that will favor only a handful of industry suppliers" — namely, the incumbents, claims Sierra vice president Marty Gruhn. According to IDC, in 1986, when the midrange market totaled $15.02 billion, these "incumbents" included: IBM, with 29.3% of the total market revenue; DEC, with 20.4%; Unisys, 9%; Hewlett-Packard, 6%; and Tandem Computer, 4.1%.

In order to continue to thrive, all vendors, entrenched and not, will need to pursue a two-pronged marketing strategy, Gruhn contends. First, they will need to capture new accounts over the next 12 months; secondly, they must reduce competitive inroads by offering consistent upgrades and enhancements to their installed bases. Yet, even if companies follow these guidelines, she cautions, "it is not clear that a high level of demand will emerge in these organizations in the future."

In spite of analysts' somewhat pessimistic predictions, most vendors claim they are expecting strong supermini sales for at least the next few years. IBM, for one, should benefit from accelerated shipments of its 9370 systems. Despite the dearth of applications software required by the small- to medium-sized companies and departments at which the machines are targeted, Big Blue was expected to have shipped 5,000 by the end of last year, according to IDC. IBM could sell another 15,000 9370s in 1988, if demand continues at its current pace, IDC calculates. In anticipation of continued strong sales, IBM expanded its base of resellers by 20% in 1987, and reportedly is expecting to expand by another 20% this year. Additionally, increased availability of all types of midrange software is a top priority for IBM's newly created Applications Systems Division.

Salesforce catches on

Third-ranked Unisys is also expecting to do well in 1988, and industry watchers expect the same. "Our salesforce is finally getting to understand our projects and the merger," says Curt Koster, program manager for entry- to midlevel systems for the Detroit-based company. Unisys' "superminis" include systems ranging from its low-end A series through its various Unix products. Koster, responsible for the Series 1100's 2200 family, says he expects the ability of the 2200 models to serve as development and/or delivery machines to serve them well in the ongoing "departmental computing explosion." In order to move beyond Unisys' installed base and capture new customers, the company will play on its "industry leads in connectivity and distributed environments," especially in terms of its strength in standards and fourth-generation languages, he explains.

Just because spending is on the rise does not mean all vendors can count on a bigger piece of the midrange pie

"The supermini market is an example of a technology-driven market driving price down," Koster says. "And we're driving the technology there."

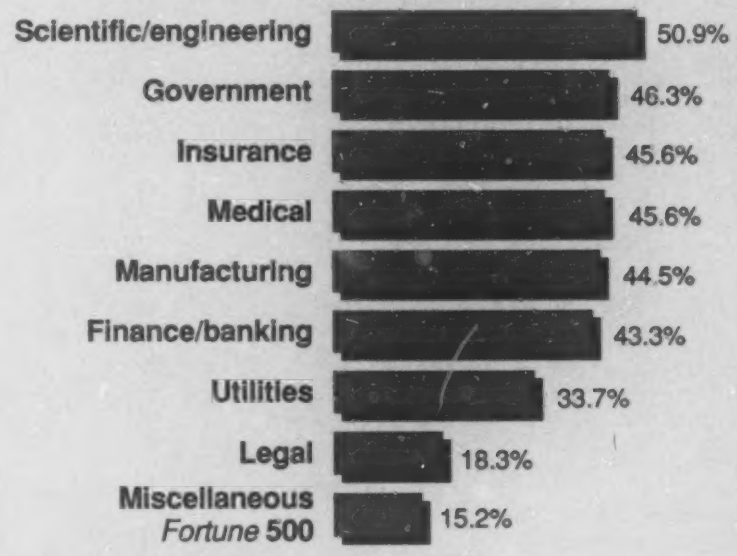
Hewlett-Packard, despite delays in shipping its HP 3000 Model 930 RISC (reduced instruction set computer) machines, says sales are strong for all six of its recently introduced architectures and expects the brisk demand to continue. Total revenue contributed by all of the Cupertino, California-based company's 3000 computers, in fact, rose 18% from 1986 to 1987, according to Linda Lazor, product line manager for future HP 3000 products. Sales of the high-end Model 950 and midlevel Series 70 were especially strong last year, she reports.

"HP this year and next are the ones to watch," IDC analyst Hallgren agrees. "If they can manage to sell outside their customer base, they should do very well."

The company is counting on its strategy offering MPE (HP's proprietary transaction-processing-oriented operating system) along with HP/UX (Unix) to help it penetrate a variety of new accounts, Lazor says. "We will have lots of stuff coming out next year, ranging from networking to office [software] products to systems," she says. "We're starting to see our huge investments [in the new Spectrum architecture] pay off," she claims. "We now have the ability to bring out leadership products in a variety of platforms." □

Supermini spending to rise

Percentage of companies expecting to increase minicomputer spending in 1988



Total survey base = 1,045 companies

Source: The Sierra Group

DATABASE

Most signals positive

Growth of new orders for computers and office machinery are on a fast track. On a seasonally adjusted basis, October new orders rose $271 million, or 5.5%, from the level in September. This increase brought the monthly total to $5.2 billion, 20% higher than the same month in 1986. New orders will grow rapidly through the third quarter of 1988.

Industrial production of computers and office machinery rebounded in September from the setback experienced in the prior month. In October, output rose an additional 1.5% on a seasonally adjusted basis. Through the third quarter of 1987, average production was running 4.1% above the average for the first three quarters of 1986. Shipments of $5.0 billion in October brought the total for the first 10 months of 1987 to $47.2 billion, 1.8% higher than the comparable period for 1986. From the end of 1987 through 1988, shipments will grow by over 15%.

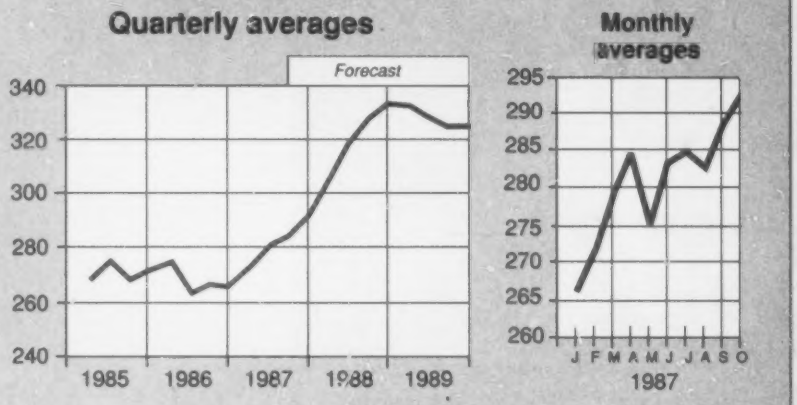
Exports of office and computing machines tallied $4.6 billion for the third quarter of 1987, a 19% increase relative to the third quarter of 1986. However, imports grew at a faster clip, up 31% in a third quarter to third quarter comparison. At $4.9 billion, imports outpaced exports by $262 million.

Edited by LINDA STALLMANN

More information can be obtained from Madeline Franchi, senior economist, Cahners Economics Department, 275 Washington St., Newton, MA 02158 Phone: (617) 964-3030.

Industrial production index for computers

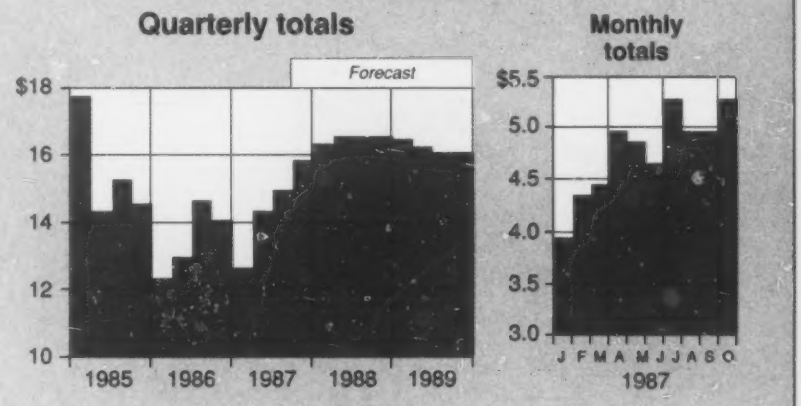
Seasonally adjusted index (1977=100)



Source: U.S. Department of Commerce; Forecast: Cahners Economics

New orders of computers

Seasonally adjusted (Current $ billions)



Source: U.S. Department of Commerce; Forecast: Cahners Economics

Computer market database

	Latest month	Previous month	Change	Year ago	Change	Next year	Change
Industrial production (SA,1977=100, September)	292.4	288.2	+1.5%	265.5	+10.1%	333.6	+14.1%
Shipments (SA, $ millions, October)	$5,047	$4,966	+1.6%	$4,594	+9.9%	$5,765	+14.2%
New orders (SA, $ millions, October)	$5,174	$4,903	+5.5%	$4,311	+20.0%	$5,509	+6.5%
Unfilled orders (SA, $ millions, October)	$19,322	$19,195	+0.7%	$19,068	+1.3%	$21,087	+9.1%
Inventory-to-shipment ratio (SA, October)	1.89	1.91	—	2.22	—	1.88	—
All employees (thousands, October)	459.3	457.6	+0.4%	465.3	-1.3%	492.4	+7.2%
Production workers (thousands, October)	151.4	150.9	+0.3%	154.6	-2.1%	159.9	+5.6%
Exports ($ millions, September)	$1,730	$1,482	+16.7%	$1,349	+28.2%	$1,664	-3.8%
Imports ($ millions, September)	$1,708	$1,589	+7.5%	$1,170	+46.0%	$1,711	+0.2%

SA = seasonally adjusted, all other data is not seasonally adjusted

Data sources: Federal Reserve Board, U.S. Bureau of the Census and U.S. Bureau of Labor Statistics
All data for SIC 357, except industrial production, SIC 357-9. Forecasts: Cahners Economics

The politics of high tech in China

Preliminary signs indicate there may be a mini-boom in the offing

By Al Furst

After two quiet years of relatively modest sales in China, American high-tech companies may finally be able to look forward to an upsurge in business activity during 1988. Like everything else in China, the reasons are part political and part economic.

First the economic reasons. A number of U.S. electronics manufacturers — including Hewlett-Packard Co. and John Fluke Manufacturing Co. — report that the number of inquiries about prospective purchases are up this fall. A rush of such inquiries usually precedes a buying spree.

Traditional Chinese spending patterns reinforce this tendency. Like many Communist countries, China runs its economy on a five-year plan. This year will be the third year of the current plan, and that's when — as one U.S. executive told me recently — "the Chinese like to turn on the spigot."

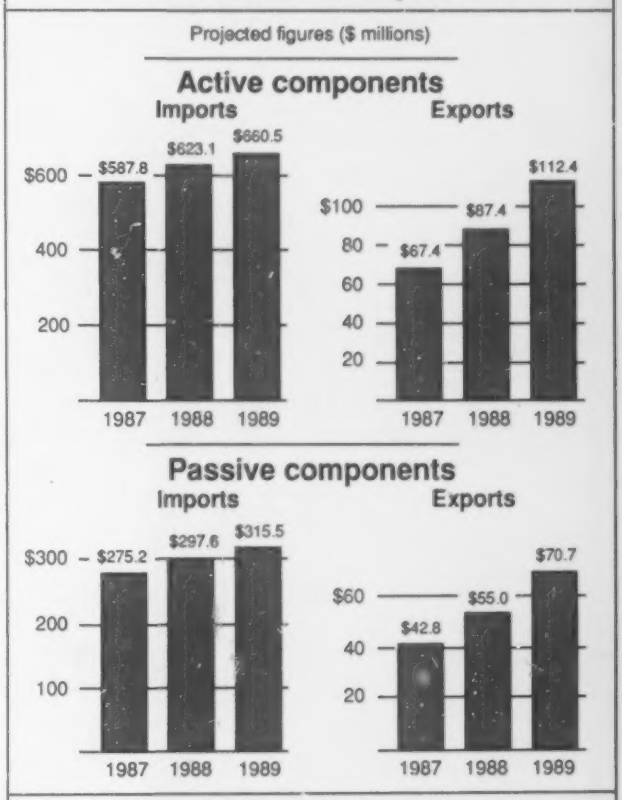
The spigot could open all the way, too, because Chinese factory managers typically squirrel away funds for a few years while they compare wares and shop around for the best buy in computers and other foreign-built equipment. Just like governnment contractors in the U.S., it's "use it or lose it;" if they don't spend the money that's been allocated to them from above, they know that those funds could disappear forever. And that's a powerful incentive to buy — even though China is still plagued by shortages in foreign currency.

The political timing for mini-boom in high tech is also right, barring unforeseen difficulties — such as China's inability or unwillingness to halt shipments of Silkworm missiles to Iran.

The new young, reform-minded leadership which swept into power last fall under Deng Xiaoping's protege, Premier Zhao Ziyang, includes some important allies of the American high-tech community. The most notable is Li Tieying who, at 51, is now the youngest member of the ruling 18-member Politburo.

China: The market for electronic components

Projected figures ($ millions)



Source: A.T. Kearney Inc.

Tieying, who is also the Minister of Electronics, has visited the U.S. several times in recent years at the invitation of the American Electronics Association, a trade association based in Santa Clara, Calif. Time and again, Li impressed his American counterparts with a willingness to listen seriously to their numerous complaints about government bureacracy.

The rise of technocrats like Li, as well as the anticipated resurgence in high-tech purchases next year, bodes well for computer and electronics manufacturers — both in Silicon Valley and along Boston's Route 128 technology highway. □